

IQRF Development Tools Installation Guide

Application Note

AN003



Simple way to smarter wireless solutions

The IQRF development tools utilize the following software:

- **IQRF IDE:** integrated development environment to create and debug IQRF applications (MICRORISC)
- **USB Custom driver:** USB driver (Microchip, MICRORISC VID/ PID)
- **CC5X:** C compiler for the PIC microcontrollers (B Knudsen Data)
- **Text editor:** for source texts creations. Any external editor beeing able to save a plain ASCII text, e.g. Windows Notepad can be used. Notepad++ is recommended.

Supported PC operating systems

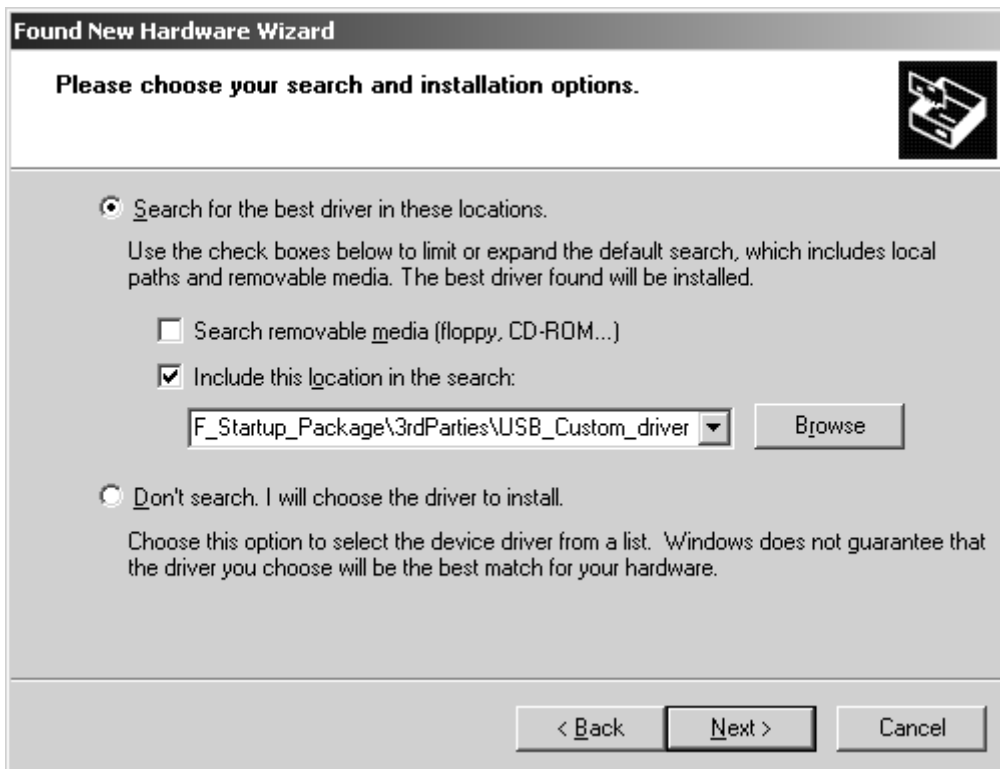
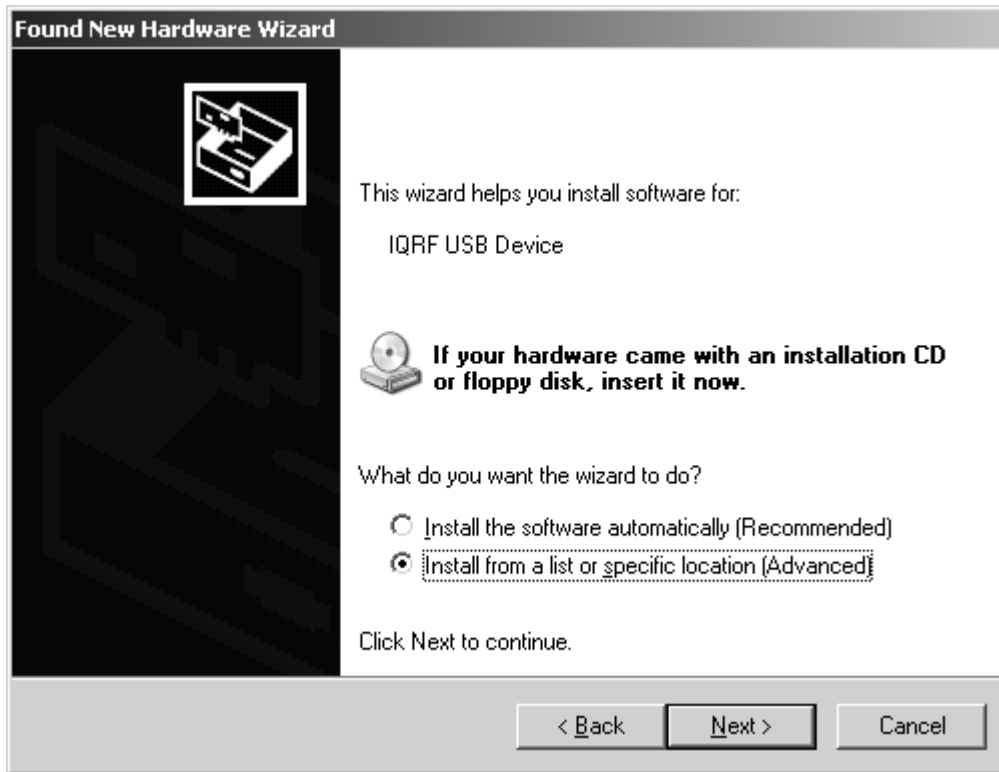
Windows 2000, XP, Vista, Windows 7

Installation

1. The **Startup Package** is available on the IQRF CD and can be downloaded from www.iqrf.com/downloads.
2. **Invoke** this selfextracting archive Startup Package (.exe) . All you need is automatically installed (including the free edition of the C compiler for non-commercial purposes) to specified directory.
3. **Connect** the **CK-USB-02** development kit to the PC. Windows detect a new USB device and ask about the **driver location**. Navigate to the `USB_Custom_driver` subdirectory. Windows administrator rights may be required for this step.

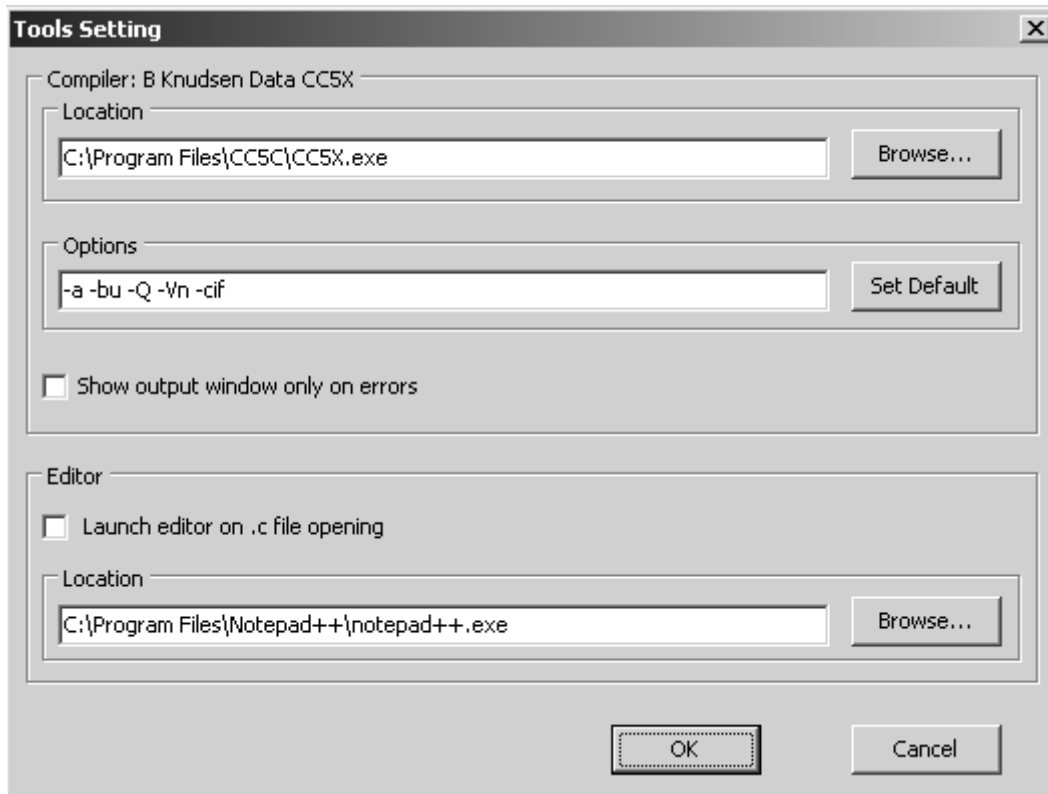
Example for Windows XP:





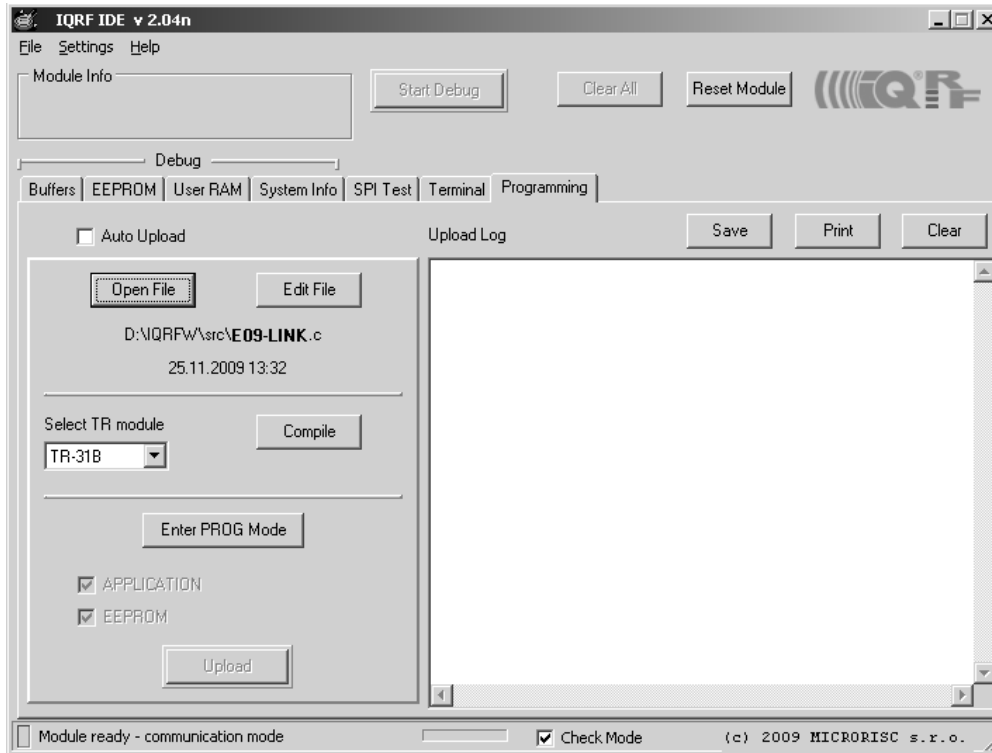


4. Invoke the IQRF IDE.
5. Set the **path to the editor** in the *Settings / Tools Setting* menu:



Tip: Notepad++ (GPL, a part of the package) is very suitable editor. **Install** it by invoking the Installer (the .EXE file) in the **Notepad++** directory.

TR type has to be selected just for compilation (after opening a C source file) by select (drop-down) list.



Test of TR modules

TR modules are delivered with the E09-LINK sample program. After power supply connecting e.g. in the DK-PGM-01(02), DK-EVAL-01 or CK-USB-02 the successful run-up is indicated by a flash of the LED on the TR.

TR modules are programmed from the factory to be ready for RF range test just after connecting of antennas to a TR pair. LEDs on the modules flash if the modules are in range each other. By increasing the distance out of range the flashes stop and are reestablished after bringing closer again. See comments in the E09-LINK program.

Proper connection between the CK and PC can be checked by the *Reset Module* button in the IQRF IDE environment. It should induce another initial LED flash.

Examples

The Package contains a series of examples in the `src` directory.

1. **Using a ready-made example** (without modifications): Upload the .HEX file (e.g. from the `hex-52B+53B` subdirectory, according to the TR type) into the TR module plugged in the CK-USB-02 kit by the *Programming* tab in the IQRF IDE environment.
1. **Using an example with possible modification**: Edit the source program (a .C file) and compile it from the C language to the .HEX format also in the *Programming* tab in the IQRF IDE environment. Then continue according the case 1 above.
2. **Creation of a new program**: It is recommended to start from the empty template `E00-START.c`. The user creates a complete program by themselves in this case. Continue similarly as in case 2 above.

To complete an IQRF design, proceed as follows:

1. Plug the TR into the CK kit.
2. If you do not intend to modify or display a source code but to program an existing code only, open required .HEX file by the *Open file* button and go to step 7.
3. Open required source file – e.g. some of examples from the Startup Package – (e.g. E09-LINK.c) or empty template E00-START.c by the *Open file* button.
4. Select the TR module type used.
5. Make possible modifications and save them then (in the text editor).
6. Compile the program by the *Compile* button. If any error is reported by the compiler, go to step 3 to correct it. The result is a compiled code in the .HEX format.
7. Switch the module to the programming mode by the *Enter PROG Mode* button.
8. Program the code into the module by the *Upload* button.
9. After uploading the application is just invoked. It is possible to debug it by the IQRF IDE (the *Debug* tab).
10. Then the module can be moved e.g. to the DK-EVAL-03 kit or to an end user equipment.

Caution: The TR module can be plugged / unplugged into / from the SIM connector while powered off only.

Tip: In case of CK-USB-02 the S1 pushbutton can be used for this. The TR module is not powered while the S1 pushbutton is held.

Then, repeat steps 3 to 9 as you need.

See IQRF IDE *Help* for details. E.g. steps 7 and 8 can be performed in one stroke by the F5 key.

Typical repeated procedure is:

- Edit external editor
- Save (Ctrl+S) external editor
- Compile (F10) IQRF IDE – the *Programming* tab
- Upload (F5) IQRF IDE – the *Programming* tab
- Debug IQRF IDE – the *Debug* and *Communication* tabs

Note: The IQRF IDE detects a TR module only if it has the SPI communication activated which depends on the application just running in the module. Otherwise IDE issues the *SPI not active* message. SPI communication can be established by entering the programming mode in the IDE. The application in the TR module is not running in the programming mode.

Troubleshooting

Firmware version of the CK kit, the USB driver version and the IQRF IDE version must be in accordance each other (marked with + in the table):

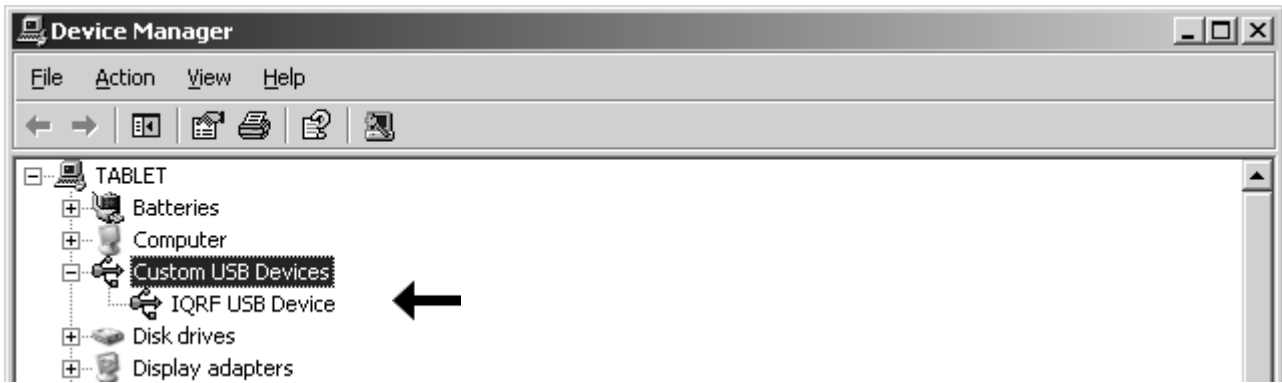
	CK-USB-02		USB driver
	FW 1.x (obsolete)	FW 2.xx	
IQRF IDE v1.0x (obsolete)	+	–	V2.3 (Microchip PICDEM FS... device)
IQRF IDE v2.xx	–	+	V1.0 (IQRF USB device)

Advanced: CK-USB-02 (FW v2.00 or higher), USB driver v1.0 and IQRF IDE v2.00 or higher.

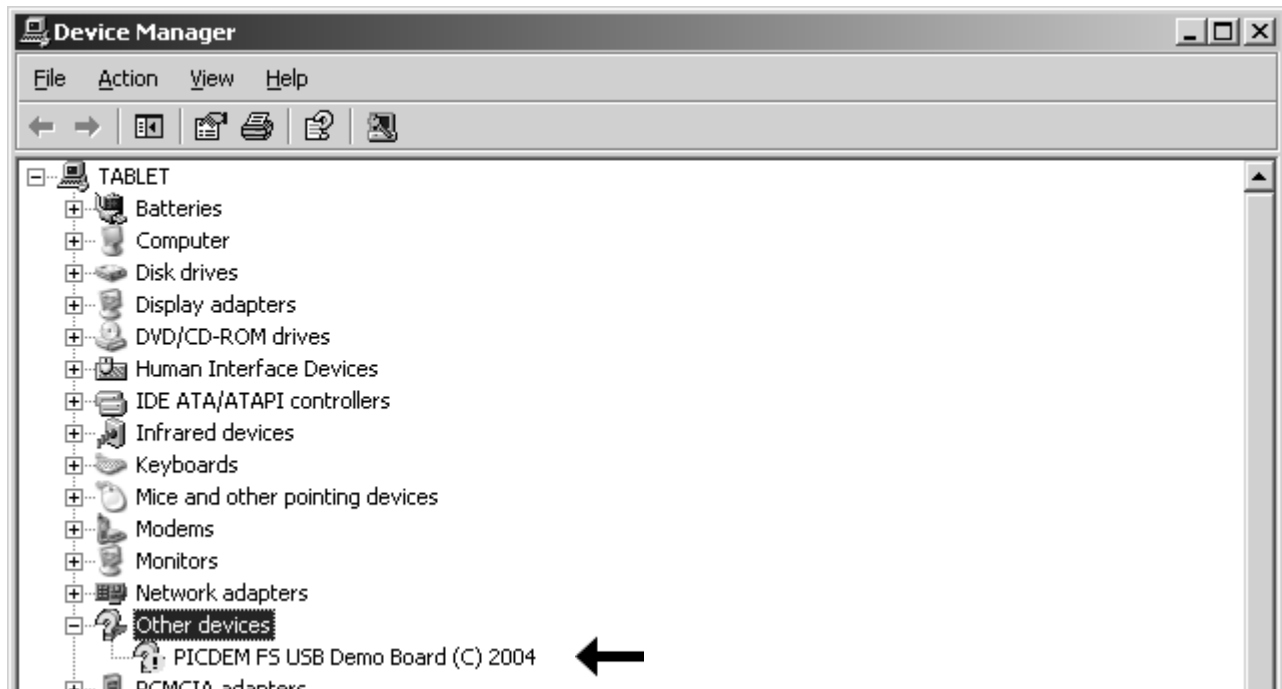
Obsolete but functional for older TR types: CK-USB-02 (FW 1.x), USB driver v2.3 and IQRF IDE v1.0x (1.05 recommended).

CK-USB-02 firmware can be upgraded by the manufacturer and (from version FW 2.00) even by the user themselves.

Properly installed driver v1.0 is displayed as follows:



Improperly installed driver can be displayed e.g. as follows:



See Control Panel / System / Hardware / Device Manager.

Windows Vista

Under the Windows Vista (either 32 b or 64 b) the IQRF IDE should be invoked in the Windows XP (Service Pack 2) compatibility mode to ensure proper USB driver functionality.

1. Click the right mouse button on the IQRF IDE icon on the Windows desktop or on the `iqr_f_ide.exe` file.
2. Select item: *Properties*
3. Select item: *Compatibility*
4. Check the box: *Run this program in compatibility mode for:*
5. Select *Windows XP (Service Pack 2)* in the selection
6. Click: *O.K.*

Document history

- 100705 Just cosmetic improvements
- 091201 Modified for IQRF OS v2.10
- 090907 Modified for IQRF IDE v2.01
- 081218 First release

Sales and Service

MICRORISC s.r.o., Delnicka 222, 506 01 Jicin, Czech Republic, EU
Tel: +420 493 538 125, Fax: +420 493 538 126, www.microrisc.com

Partners and distribution:

Please visit www.iqrf.org/partners

Quality management:

ISO 9001 : 2000 certified

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Web	www.iqrf.org
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Simple way to smarter wireless solutions